

August 14, 2015

Statement of Data Evaluation

To: Worthy Glover, San Juan Public Health;
Utah Department of Environmental Quality, Division of Water Quality
From: Craig J. Dietrich, Ph.D., DABT
Toxicologist
Utah Department of Health, Environmental Epidemiology Program

This statement is provided by the Utah Department of Health (UDOH) Environmental Epidemiology Program (EEP). It is a written summary of an analysis of San Juan River, UT water testing carried out by the Utah Department of Environmental Quality on August 11th, 2015.

Data were compared to screening values for both human-health based effects and agricultural use (**Table 2**).

Screening values are taken from Agency for Toxic Substance and Disease Registry (ATSDR) comparison values (CVs) for drinking water when available. Those values can be found here: http://health.utah.gov/enviroepi/appletree/Drinking_Water_CV.pdf.

When ATSDR values were not available, EPA Regional Screening Levels (RSLs) for residential tap water were used. EPA RSLs can be found here:

http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/restap_sl_table_run_JUNE2015_rev.pdf

Total metal data was used for assessment of human-health based effects.

Agricultural Screening Values are derived from National Academy of Science (NAS) Water Quality Criteria, 1972 (the Blue Book). Those guidelines are reprinted in EPA's Guidelines for the Reuse of Waters for Irrigation found here: <http://nepis.epa.gov/Adobe/PDF/P100FS7K.pdf>
Utah Standards of Quality for Waters of the State can be found here:

<http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T16>

Agricultural guidelines cited from University of Arkansas (UA) can be found here:
<https://www.uaex.edu/publications/PDF/FSA-3021.pdf>

Dissolved metal values were used for the assessment of agricultural use waters. Sulfate, nitrate/nitrite, and pH were also assessed.

Contaminants that do not exceed screening values are not considered to pose a risk of adverse health effects.

The current data set (collected 8/11/2015) can be found here:
<http://www.deq.utah.gov/Topics/Water/goldkingmine/index.htm>

Results

For agricultural use, no dissolved metal contaminants, sulfates, nitrates/nitrites or pH values exceeded livestock or irrigation guideline values.

For public use, seven contaminants exceeded screening values: aluminum, arsenic, barium, copper, iron, lead, and manganese.

Contaminants that exceed screening levels are then evaluated for recreational exposures. UDOH defines a standard recreational exposure as 60 days/year for two hours/day. It considers skin contact and accidental ingestion of river waters during recreation (50 mL/hr).

Exposure evaluation uses the 95% upper confidence limit (95% UCL) for the samples of a particular contaminant. Calculated contaminant 95% UCLs that fall below screening levels are not considered for further evaluation. For this data set, the 95% UCLs for barium and copper fell below screening levels and were not further evaluated.

A standard ATSDR exposure calculation is used that incorporates the type of contaminant, contaminant concentration, amount of exposure (time), intake/exposure rate, and body weight. To be as protective as possible of the most sensitive populations, exposures are evaluated for children. Estimated exposure doses are then compared to ATSDR Minimal Risk Levels (MRLs) when available, or EPA reference doses (RfDs) in **Table 1**.

Estimated recreational exposure dosages fall below health-based guidelines for these contaminants. Therefore, the EEP currently finds that exposure to the contaminants of the San Juan River tested on August 11th, 2015 by UDEQ are not expected to result in adverse health effects for people recreating in the waters.

The EEP does recommend that recreational users carry their own drinking water and not rely on filtering or purifying river waters.

Further evaluations and updated findings will be provided as new data is collected.

Table 1. Exposure evaluation for contaminants exceeding public use screening values.

Contaminant	Concentration [95% UCL] ($\mu\text{g/L}$)	Estimated Child Exposure Dose (mg/kg/day)	Health-based dose guideline (mg/kg/day)	Source of guideline
Aluminum	77,460	8.23E-02 ^O 7.68E-02 ^D <u>1.59E-01^T</u>	1.0E+00	ATSDR Chronic MRL
Arsenic	17.7	1.88E-05 ^O 1.75E-06 ^D <u>2.06E-05^T</u>	5.00E-03	ATSDR Acute MRL
Barium	1566	Not considered for further evaluation, (95% UCL below screening value)		
Copper	83.23	Not considered for further evaluation, (95% UCL below screening value)		
Iron	46470	<u>4.94E-02^T</u>	8.75E-01	Provisional based upon EPA RSL*
Lead	81.97	8.71E-05 ^O 3.25E-07 ^D <u>8.71E-05^T</u>	9.37E-04	Provisional based upon EPA MCL**
Manganese	1987	<u>2.11E-03^O</u> <u>2.28E-04^D</u>	1.4E-01 ^O 5.00E-02 ^D	EPA RfD (oral) EPA RfD (dermal)

^O: oral exposure

^D: dermal exposure

^T: total combined (if applicable)

*: No established iron guideline exists. Guideline based upon EPA RSL, value indicates chronic drinking water ingestion exposure dosage at screening level.

**: No established lead guideline exists for short-term exposures. Guideline based on EPA MCL action level, value indicates chronic drinking water ingestion exposure dosage at MCL action level.

Table 2. Health-based and agricultural comparison values for San Juan River contaminants.

Analyte	CAS #	Units	Drinking Water CV (ppb)		Livestock Water (ug/L) [Dissolved Metal]	Irrigation Waters (ug/L) [NAS, 1972] [Dissolved Metals]		Utah WQ Standards for San Juan River [Dissolved metals]					
			Health-Based Comparison Value for Water Ingestion (CV) [Total Metals]			Long-Term	Short-Term	1C (Domestic)	3B (warm water fish) [1-hour]	3B (warm water fish) [4-day]	4 (agriculture)		
			Health-Based Comparison Value for Water Ingestion (CV) [Total Metals]	CV Type and Source									
Hardness	-	mg/L			180 mg/L (UA)							Hardness	
Aluminum	7429-90-5	µg/L	10,000	Child Intermediate EMEG	5,000 (NAS)	5,000	20,000		750	87		Aluminum	
Antimony	7440-36-0	µg/L	4	Child RMEG	No Data Available	No Data Available	No Data Available					Antimony	
Arsenic	7440-38-2	µg/L	3	Child RMEG & Chronic EMEG	200 (NAS)	100	2,000	10	340	150	100	Arsenic	
Barium	7440-39-3	µg/L	2,000	Child Intermediate EMEG	No Data Available	No Data Available	No Data Available	1000				Barium	
Beryllium	7440-41-7	µg/L	20	Child RMEG & Chronic EMEG	100 (EPA)	100 (EPA)	No Data Available	<4				Beryllium	
Cadmium	7440-43-9	µg/L	5	Child Intermediate EMEG	50 (NAS)	10	50	10	2	0.25	10	Cadmium	
Calcium	7440-70-2	µg/L	-	No CVs available	500,000 (UA)	No Data Available	No Data Available					Calcium	
Chromium	7440-47-3	µg/L	60	Child RSL, non-cancer, Cr(VI)	1,000 (NAS)	100	1,000	50	16 (VI);	11 (VI);	100	Chromium	
Cobalt	7440-48-4	µg/L	100	Child Intermediate EMEG	1,000 (NAS)	50	5,000					Cobalt	
Copper	7440-50-8	µg/L	100	Child Intermediate EMEG	500 (NAS)	200	5,000		13	9	200	Copper	
Iron	7439-89-6	µg/L	14,000	Child RSL, non-cancer	Limit Not Considered Necessary (NAS & EPA)	5,000	20,000		1000	1000		Iron	
Lead	7439-92-1	µg/L	15	Child non-carcinogenic RSL	100 (NAS)	5,000	10,000	15	65	2.5	100	Lead	
Magnesium	7439-95-4	µg/L	-	No CVs available	250,000 (UA)	No Data Available	No Data Available					Magnesium	
Manganese	7439-96-5	µg/L	500	Child RMEG	50 (EPA)	200	10,000					Manganese	
Molybdenum	7439-98-7	µg/L	50	Child RMEG	300 (EPA)	10	50					Molybdenum	
Nickel	7440-02-0	µg/L	200	Child RMEG	No Data Available	200	2,000		468	52		Nickel	
Nitrate+Nitrite					100,000 (EPA)								
Nitrite					10,000 (EPA)			10,000					
Potassium	7440-22-4	µg/L	-	No CVs available	No Data Available	No Data Available	No Data Available					Potassium	
Selenium	7782-49-2	µg/L	50	Child RMEG	50 (NAS)	20	20	50	18.4	4.6	50	Selenium	
Silver	7440-22-4	µg/L	50	Child RMEG	No Data Available	No Data Available	No Data Available	50	1.6	-		Silver	
Sodium	7440-23-5	µg/L	-	No CVs available	1,000,000 (UA)	No Data Available	No Data Available					Sodium	
Sulfate					1,000,000 (EPA)								
Thallium	7440-28-0	µg/L	0.2	Child non-carcinogenic RSL	No Data Available	No Data Available	No Data Available					Thallium	
Vanadium	7440-62-2	µg/L	100	Child Intermediate EMEG	100 (NAS)	100	1,000					Vanadium	
Zinc	7440-66-6	µg/L	3,000	Child Intermediate EMEG	25,000 (NAS)	2,000	10,000		120	120		Zinc	
Mercury	7439-97-6	µg/L	0.63	Child non-carcinogenic RSL, elementalHg, µg/L	10 (NAS)	No Data Available	No Data Available	2	-	0.012		Mercury	
TDS		mg/L			1200 (Utah)	500,000-1,000,000 (NAS)							
pH					6.5-9 (Utah)	4.5-9 (NAS)							
			RMEG: ATSDR Reference Dose Media Evaluation Guide EMEG: ATSDR Environmental Media Evaluation Guide RSL: EPA Regional Screening Level										